# MONTHLY NOTICES

OF THE

# ROYAL ASTRONOMICAL SOCIETY.

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Professor ADAMS, President, in the Chair.

Wm. E. Mitchell, Esq., The Fort, Norquay, Cornwall;
C. R. Tompkins, Esq., H.M. Dockyard, Portsmouth; and
G. H. With, Esq., Hereford;

were balloted for and duly elected Fellows of the Society.

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*The Society having Removed from Somerset House, all Letters, Parcels, and Communications are in future to be addressed* ROYAL ASTRONOMICAL SOCIETY, BURLINGTON HOUSE, Piccadilly, W.

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## *Note on a Paper by Mr. Christie, "On a Method of connecting the Curvature of the Lines in the Dispersion Spectrum."*

By William Simms, Esq.

In an investigation into the cause of the curvature of the lines in the Dispersion Spectrum, March No., p. 263, Mr. Christie has shown that a correction may be obtained by a direct reflexion through the same plane; but when the ordinary right-angled prism is used at the end of the train for the purpose of returning the spectrum, the evil is propagated, precisely as it would be had it followed its original course through a similar number of prisms.

Upon reading Mr. Christie's paper, the idea occurred to me, that by employing a prism of three reflexions, the correction would also be obtained, carrying on the spectrum at a higher plane, as with the right-angled prism; and so this improvement could be readily made to existing spectroscopes.

Mr. Christie has suggested, that to avoid the loss of light from the middle portion of the train, the upper and lower halves should be divided, raising the upper halves; this might be desirable in a new instrument, but would be a costly alteration to an old one. I think there would generally be sufficient light without having recourse to this expedient; if thought desirable, a detachable prism might be applied, and this, or the two reflexion prisms, used at pleasure.

*Burnham,*
1874, *May* 4.

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Professor C. V. Zenger, in two letters addressed to Mr. Glaisher, dated Prague, January 17 and March 22, 1874, proposes a method of enlarging lunar and solar photographs so as to correct the spherical aberration, and makes suggestions as to the use of photographs in the coming transit of *Venus*.

In the first instance he gets very sharp images by using a parabolic spectrum bought from Mr. Browning, the rest of the spherical aberration being destroyed by a very fine aplanatic lens from Steinheil with negative focal length. He got in this way solar images with spots on them of, perhaps, the greatest sharpness ever obtained, with faculæ, willow leaves, and a most sharply defined gradation of penumbra, the diameter of the Sun's image being from 20 to 24 inches.

He then conceived that the remainder of aberration got in the images might be easily destroyed by photographing with lenses whose remainder of error was opposite to that of the photographing speculum or refractor, and tried the experiment with much delight, on a fine sample of Rutherford's 15-inch lunar photograph, with a very good, but a little over-corrected, opera-glass from Paris, magnifying 8 to 10 diameters. Not only the lunar photograph got a wholly improved aspect, the influences of unevenness being nearly destroyed, (falling in the opposite direction to the spherical aberration), but objects could be detected in it invisible, or very uncertain, even with the aid of an excellent magnifier by Steinheil. Ridges, shadows, and inclined planes, slopes of the *illuminated* and uneven surface of the inner parts of the craters, not or scarcely visible with the naked eye and magnifying aplanatic lens, became as sharp and definite as he could see them in one of the clearest and driest winter nights with Browning's 5-inch reflector with 100 and 300 magnifying power.

Some lunar photographs originally 3 inches in diameter, and enlarged by Brothers of Manchester to 11 inches, Professor Zenger has in this way enlarged to 110 inches, without losing, and indeed gaining, definition. Specimens (on paper) of *Clavius* and its vicinity accompanied the letters, and were exhibited at the meet-

ing of the Society; but he proposes to bring with him to he ensuing meeting of the British Association glass positives on the scale of 80 to 110 inches.

He concludes with suggestions as to photographing the transit:

1°. It is of no use to photograph the moment of the contact, because accuracy is entirely destroyed by the effect of the interference.

2°. It would be better to have the passage photographed at intervals so as to ascertain exactly the moment at which *Venus* passes through a determined meridian on the Sun's surface. The Sun's apparent diameter being nearly the Moon's or 31′, it can by his process easily be enlarged to 110 or more inches diameter, one inch corresponding to $\frac{31'}{110} = 0''{\cdot}0282$ or $1''{\cdot}7$. By subdividing to one-hundredth, it would be possible to ascertain the position of *Venus* on the Sun's disc up to $0''{\cdot}017$ or $0^s{\cdot}001$ in time, an amount of precision scarcely obtainable by the method proposed by M. Janssen at the last meeting at Bradford. But he conceives the magnifying might even go to 200 or 250 inches.

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## *On a remarkable Structure visible upon the Photographs of the Solar Eclipse of December* 12, 1871.

By A. Cowper Ranyard, Esq.

The structure which I am about to describe is by no means a marked feature on the Indian photographs; indeed, it was not observed until after nearly a year had been spent in cataloguing the details which are to be made out on the different negatives. When, however, it has once been pointed out, no careful observer can have any doubt as to its existence; and the tardiness with which it was observed may perhaps be accounted for by the fact that attention was principally directed to an examination of the dark or partially opaque details of the photographs which correspond to the luminous details of the corona, whereas this was a bright or transparent structure; and bright spots, lines, or patches had always been regarded as photographic defects, and consequently but little attention had been paid to them.

The original negatives are very small: the dark moon is represented by a transparent circle about $\frac{3}{10}$ths of an inch in diameter, and the whole extension of the corona could be covered by a sixpence. The separate details of the coronal structure are therefore very minute, and it would be impossible from the examination of a single negative to determine whether any small marking has its origin in some almost microscopic impurity on the collodion, or whether it represents a vast mass of many million cubic miles in